

IV. AMENDMENTS TO THE DRAWINGS

--- Replacement and annotated mark-up drawing sheets for amended figures showing the amended figures, if any, are attached at the Appendix hereto. Each figure is in compliance with 37 C.F.R. § 1.84. An explanation of the changes, if any, is set forth below in this “Amendments to the Drawings” section. Replacement drawing sheets are identified in the top margin as “Replacement Sheet.” Any replacement drawing sheet including amended figures includes all of the figures appearing on the immediate prior version of the sheet. Any annotated drawing sheets, if the same are required by the Examiner, are identified in the top margin as “Annotated Marked-Up Drawings.” Any deleted figure is noted by an instruction to delete the figure. Any corresponding amendment to the specification necessary to be made because of an amendment to the drawings in this section is made in the corresponding “Amendments to Specification” section.

- THE DRAWINGS OF THE PATENT IS HEREBY AMENDED AS SET FORTH BELOW:
 - *No Amendment Made to the Drawings*
 - *Attachments: None*

V. REMARKS/ARGUMENTS

- STATUS OF THE CLAIMS

Claims 1 and 4–24 remain pending in this application. Claims 1 and 4 are currently amended. Claims 2 and 3 were previously cancelled. Claims 5, 7 – 13, 15, 17 – 21 and 24 are as in the original application.

- OBJECTIONS

- OBJECTIONS TO CLAIMS

- Examiner's Position

The Examiner has raised no objections.

- Applicants' Response

N/A

- REJECTIONS

- Rejections under 35 U.S.C. 103(a)

Rejections of claims 4-14 and 22-24 under 35 U.S.C. 103(a) as being unpatentable over Karasawa et al. JP 55-079441, in view of Taylor

- Examiner's Position

At Section 3, page 2, the Examiner rejects claims 4-14 and 22-24 under 35 U.S.C. 103(a) as being unpatentable over Karasawa *et al.* JP 55-079441, in view of Taylor (J. Histochemistry and Cytochemistry, vol. 8, pp. 248-257 (1960)). At the end of Section 3, at page 3, the Examiner emphasizes that the rejection of claims in this section does not apply to the composition applied to the ROM medium. Examiner states that the Taylor reference teaches tetrapropyl, diethyl/dimethyl, tetraethyl dyes in table I on page 256 and includes their absorption maxima. As stated by the Examiner, Figure 7 in Taylor evidences such spectra

being more than 150 nm wide and centered about 610-650 nm. Examiner states that it would have been obvious to use other alkyl groups, such as propyl or ethyl, in place of at least one of the N-methyl groups as disclosed in Taylor in place of the methyl groups used in the example of Karasawa *et al.* Examiner disagrees that the references are non-analogous, noting that in both cases the references are concerned with the absorption of dyes. As stated by the Examiner, "Removing the "transient" language does not preclude transient reactions." It broadens the claims. Finally, the Examiner argues that the spectroscopic data and similarity of the compounds leads one to make the substitution with a reasonable chance of success.

- Applicants Position

Applicants herein address the Examiner's 103(a) rejections of claims 4-14 and 22-24 as set forth in the Examiner's Office Action. Applicants respectfully traverse the rejections of the claims in part on the argument that the combining references do not teach, suggest, or motivate combination of elements to produce the instant invention, especially in view of the large number of experimental options and unpredictability in the art. Also, Applicants respectfully assert that the Examiner has erred in his claim analysis.

Applicants have pointed out that absorption spectra obtained under the conditions of the Taylor reference are not representative of the spectra measured in more concentrated forms as might be required to construct an operable invention as in the instant case. Applicants have also pointed out, that because of the phenomenon of dye aggregation the behavior of simple thiazine type dyes upon concentration is not predictable from the spectra such as those found in the Taylor reference. As discussed below, this is simply because the aggregation phenomenon is dependent on steric factors that are not revealed by an absorption spectrum. Because of this, compound choices based on spectra in Taylor would not be reliable.

Applicants cited in one case a quantitative example (Patil *et al.*, *Phys. Chem. Chem. Phys.*, 2000, 2, 4313-4317) documenting the well-known aggregation behavior of the thiazine dye methylene blue, as used in Karasawa. One of ordinary skill in the art at the time of filing of the instant application would have been aware of the absorption maxima of methylene blue near 655 nm in dilute solution, and would have also been aware that upon aggregation that this absorption maximum undergoes a hypsochromic shift or blue shift to a wavelength near 610 nm. As such, as in Karasawa, a PHOSITA would not have expected photochemical

activation with an optical reader centered at 650 nm. Because aggregation behavior is generally known for the thiazines of this type, a PHOSITA would have expected that other such thiazines would behave similarly.

Applicants also showed evidence of record, disclosed in U.S. 2004/0152017 at [0060], that because of this phenomenon, methylene blue, although in dilute solution appearing suitable for activation by an optical reader at 650 nm, in actuality is not suitable in the instant case. This confirms the expectations of the Paxil reference as well as expectations of prior art. However, the unexpected spectral stability of concentrated MB-3 (propylene blue) in an optical medium was discovered only by experimentation.

Examiner states that it would have been obvious to use other alkyl groups, such as propyl or ethyl, in place of at least one of the N-methyl groups as disclosed in Taylor in place of the methyl groups used in the example of Karasawa *et al.* Considering the hundreds, if not thousands of possible choices for the genus of thiazine dyes substituted with small alkyl groups ($n < 6$), Applicants can find no suggestion in the references cited by the Examiner to choose any particular dye, including propylene blue (MB-3), which has tetrapropyl substitution.

Because of all the above factors, Applicants argue that a case of obviousness has not been established.

Further, Applicants respectfully point out that the Examiner has erred in his analysis of the content of the rejected claims. Applicants reemphasize that claims 4-14 and 22-24 are directed to a composition on an optical disc such as a ROM. Thus Examiner's forceful statement, in reference to the Kurasawa citation, that the rejections under **"this heading do not include those directed to the composition applied to the ROM medium"** is incorrect *ob vio*.

Applicants quote directly from independent claim 4: "A composition affixed to an optical recording medium, the composition comprising:...". Claims 5-13 are directly or indirectly dependent on claim 4, and thereby contain this limitation. Claim 14 contains the limitation "an optical medium." Similarly, Applicants quote from independent claim 22: "An optical disc comprising a composition having: an electron transfer agent,...". Claims 23-24, dependent on claim 22, also contain this limitation. Thus, in contrast to the Examiner's

assertion, claims 4-14 and 22-24 are accurately directed to the composition applied to a ROM medium, understanding clearly that as commonly used, an “optical recording medium” and an “optical disc” are both ROM media.

By the Examiner’s own comments, one leg of the Examiner’s obviousness arguments forcefully pertain to this limitation. For the above reasons, and because the Examiner objectively erred in his analysis of the rejected claims, Applicants respectfully request that the Examiner withdraw his rejections in this case.

Claim 1, 14-15, and 21 Rejections Under U.S.C. 35 103(a) as being Unpatentable over Smith et al. in View of Taylor

- Examiner's Position

Claims 1, 14-15, and 21 stand rejected Under U.S.C. 35 103(a) as being unpatentable over Smith *et al.* (U.S. 5,815,484) in view of Taylor (J. Histochemistry and Cytochemistry, vol. 8, pp. 248-257 (1960)) (see Section 4, page 4 of the Office Action).

According to the Examiner, Smith *et al.* teach the use of various phenothiazines including methylene blue and Toluidine blue O in copy prevention of optical media. As stated by the Examiner, it would have been obvious to use other alkyl group substitution as disclosed by Taylor. The Examiner indicates that the question is one of spectroscopic equivalence of the dyes, and suggests, at lines 5-7, page 7 of the Office Action, that Applicants might provide data evidencing unexpected results when propylene blue is used in place of methylene blue. The Examiner also notes that the instant claims do not preclude the presence of oxygen to ensure coloration of the thiazine dye, as is used in the Smith reference.

- Applicant's Position

Applicants herein address the Examiner’s 103(a) rejections of claims 1, 14-15 and 21 as set forth in the Examiner’s Office Action and respectfully traverse. In view of the Examiner’s comments, independent claims 1 and 14 have been amended to contain the limitation that optical state interconversion is not caused by oxygen, as is the case in the Smith reference cited by the Examiner.

Applicants respectfully traverse the rejections of claims as amended based in part on the argument that the combining references lack the necessary combining elements. Further, there is neither taught nor suggested a reason to combine, nor is motivation provided for such. Further, the cited references do not suggest or teach the specific use of propylene blue, which is only one of a large genus of thiazine dyes, the species common to the rejected claims.

In claims 1, 14, and 21 the selection of the particular species, MB-3 (propylene blue), only one species of a very large genus of thiazine dyes, is not directed by the cited references. For instance, of the 22 thiazine dyes disclosed in the Taylor reference in Table I, there is no teaching as to the suitability of propylene blue for the instant purpose, other than that some of the dyes in Table 1 absorb poorly at 650 nm.

Further, at column 4, lines 55-57, Smith teaches that the “oxidizing reactive compound may be selected from the group consisting of methylene blue, brilliant cresyl blue, basic blue 3 and toluidine blue O.” (We note, however, that Smith uses the term “oxidizing reactive compound” in an objectionable way, because as disclosed, oxygen is the “oxidizing reactive compound” and methylene blue, for example, is an oxidized form of leucomethylene blue, not an oxidizing substance). Thus, neither reference teaches nor specifically suggests the choice of propylene blue, as in claims 1, 14-15, and 21.

With respect to claim 1, no element of photochemical activation of leucomethylene blue (or methylene blue) is found in Smith *et al.*, as is true for the Taylor reference also. Thus, Examiner’s rejections lack authority over claim 1, because the necessary elements are lacking and can not be taught by the references in any aspect.

Also, in distinct contrast to Smith, claims 1 and 14 now contain the limitation of an optical medium wherein, as amended, oxygen is excluded as a causative factor in optical state change; thus state interconversion is functionally free from the cause of oxygen, as is the case in the Smith reference.

In view of the above considerations, Applicants respectfully request that the rejections of claims 1, 14-15 and 21 be withdrawn.

Claim 1, 14-15, and 21 Rejections Under U.S.C. 35 103(a) as being Unpatentable over Selinfreund et al. in view of Smith et al. and Taylor.

- Examiner's Position

Claims 1, 14-15, and 21 stand rejected under U.S.C. 35 103(a) as being unpatentable over Selinfreund *et al.* (WO 02/03386) in view of Smith *et al.* and Taylor (J. Histochemistry and Cytochemistry, vol. 8, pp. 248-257 (1960)) (see Section 5, page 5 of the Office Action) According to the Examiner, Selinfreund *et al.* , especially at Figure 8, teach a variety of relevant elements including an optical recording medium wherein the light sensitive materials are provided over the whole medium, or on one surface at predetermined areas. The Examiner further states that an embodiment of a security dye coated on a CD is disclosed, as are examples that describe a medium with authentication software. The Examiner further states that the use of methylene blue with DVD media is disclosed, as are other embodiments of optical media construction. According to the Examiner, it would be obvious to one skilled in the art to modify the embodiment of figure 8 as taught by Smith *et al.* and the disclosure of Taylor whereby different alkyl groups such as ethyl or propyl are substituted for the methyl groups of methylene blue used by Smith *et al.*, and Selinfreund *et al.* with a reasonable expectation of success.

- Applicant's Position

Applicants herein address the Examiner's 103(a) rejections of claims 1, 14-15 and 21 as set forth in the Examiner's Office Action. Applicants respectfully traverse the rejections of claims based in part on the argument that the combining references lack the necessary combining elements. Further, the cited references do not suggest or teach the specific use of propylene blue, which is only one of a large genus of thiazine dyes, the species common to the rejected claims. As such, Applicants respectfully assert that a case of obviousness has not been made.

Applicants have noted that the absorption spectra disclosed by Taylor are of thiazine type dyes, not their *leuco* forms as utilized in Smith. Large numbers of thiazine dyes are disclosed in Taylor, at least 22 in Table I, and other than the fact that several of the compounds at face value would not absorb light properly, there is no reason to exclude any of them from experimentation. Further, there no obvious reason to combine elements of the

invention of Smith *et al.*, which directs toward the use of uncolored *leuco* dye forms, with the spectra of Taylor that comprise highly colored native forms. Also, because the Smith reference in claim 1 specifically teaches the use of oxygen as a causative environmental factor for transformation of optical states, the reference cannot be cited against amended claims 1 and 14 because that causative factor is now excluded.

As previously noted, Selinfreund *et al.*, in Table 1, page 21, indicate that methylene blue may be (*i.e.*, possibly) be used as a security element, but the suggestion was prophetic, and later shown to be inoperable, as has been repeatedly stated in this Amendment. The discovery of propylene blue was non-routine, made only by experiment, and the options for experimentation were demonstrably large.

In view of the above considerations, and in part that the necessary elements are not present in the combining references, Applicants respectfully request that such the rejections of claims 1, 14-15 and 21 be withdrawn.

Claim 1, 14-15, and 21 Rejections Under U.S.C. 35 103(a) as being Unpatentable over Selinfreund et al. in view of Taylor.

- Examiner's Position

Claims 1, 14-15, and 21 stand rejected under U.S.C. 35 103(a) as being unpatentable over Selinfreund *et al.* ('631) in view of Taylor (J. Histochemistry and Cytochemistry, vol. 8, pp. 248-257 (1960)) (see Section 6, page 7 of the Office Action).

According to the Examiner, Selinfreund *et al.* teaches in claims 36-52 the optical recording medium where the light sensitive materials which affect authentication are provided over the whole medium which is then coated with a reflective layer. The Examiner indicates that [0053] describes a medium provided with authentication software and the use of methylene blue with DVD media is disclosed in table 1, page 7. Examiner states that it would have been obvious to modify the embodiment of claims 36-52 in Selinfreund *et al.* '631 by using other alkyl groups, as disclosed in the Taylor reference in place of at least one methyl groups of the methylene blue as used by Selinfreund. The Examiner states that the "question is one of equivalence of the dyes, spectroscopically which is addressed by table 1 of Taylor and discussed above".

- Applicant's Position

Applicants herein address the Examiner's 103(a) rejections of claims 1, 14-15 and 21 as set forth in the Examiner's Office Action. Applicants respectfully traverse the rejections of claims based in part on the argument that the art described therein is of such unpredictability that one skilled in the art would not find the combined teaching to make obvious the instant invention as in claims 1, 14-15 and 21. Further, the cited references do not suggest or teach the specific use of propylene blue, which is only one of a very large genus of alkyl-substituted thiazine dyes, the species common to the rejected claims.

Applicants have discussed at length herein the difficulty of discovering a dye useful for the invention, and that small structural differences in the dye structure result in large differences in behavior of the dye. As has been noted, both methylene blue and propylene have similar absorption spectra in solution, are structurally analogous, but the behave quite differently in concentrated form, as is necessary to form a operable optical medium as in claims 1, 14-15 and 21. The phenomenon is related to aggregation, and this process is not predictable from solution spectra, such as those disclosed by the Taylor reference. Even though spectroscopically equivalent, some dyes will aggregate and some will not. However, the Examiner has stated that the question is one of spectroscopic equivalence. The Examiner fails to realize that spectroscopic equivalence of the dyes in dilute solution is not a sufficient criterion, and is even a misleading criterion.

If spectroscopic equivalence in dilute solution, as in Taylor, was the question at issue, then both methylene blue and propylene blue would be functionally equivalent. However, as well demonstrated, for instance in U.S. 2004/0152017 at [0060], the two compounds are not functionally equivalent.

The absorption spectra disclosed by Taylor in Table I are of thiazine type dyes in dilute solution. Examiner states that it would have been obvious to modify the embodiment of claims 36-52 in Selinfreund *et al.* '631 by using other alkyl groups. Large numbers (22) of thiazine dyes are disclosed in Taylor, and other than the fact that several of the compounds (with H substitution) at face value do not absorb light properly, there is no reason to exclude any of them from experimentation.

In addition to the compounds and spectra directly disclosed in Taylor, the Examiner will readily see that there are many more compounds in that genus which comprises alkyl-substituted thiazines. Table I of Taylor shows 22 different compounds, constructed with only three alkyl substituents (and H): methyl, ethyl, and propyl. However, many more possibilities exist, and the number of possible compounds increases rapidly as the number of alkyl substituent is increased even by a small number, for instance by adding butyl or pentyl to the list of possibilities. Further, the spectral properties of these compounds in dilute solution will be very similar, because the alkyl groups do not appreciably perturb the electronic structure of the thiazine nucleus. Because of the large number of possibilities, the Examiner will see that it was not obvious to modify the embodiment of claims 36-52 in Selinfreund *et al.* '631 by using other alkyl groups

Hence, one skilled in the art would not find obvious the invention of the subject claims when considering the two references cited by the Examiner. Taylor lacks the predictability needed to rise to the point of obviousness when combined with the Selinfreund reference. Spectral equivalence in dilute solution is not functional equivalence.

Further, neither reference suggests or teaches propylene blue, the species chosen in claims 1, 14-15, and 21. The genus of alkyl substituted thiazines is very large, and there is nothing in the combined references that suggests selecting the specific compound.

In view of the above considerations, in part because of unpredictability in the art, and in part because of the lack of specificity of the cited references, Applicants respectfully request that such the rejections of claims 1, 14-15 and 21 be withdrawn.

- Rejection under Judicially Created Doctrine of Obviousness-type Double Patenting

Rejections Over Claims 1-17 of U.S. Patent No. 6,942,392

- Examiner's Position

The Examiner has rejected all of the claims, claims 1 and 4-24, under the judicially created doctrine of obvious-type double patenting as being unpatentable over claims 1 – 17 of U.S. Patent No. 6,952,392. The Examiner argues that although the conflicting claims are not identical, it would be obvious to use the propylene blue compounds based upon the direction in claim 8 to the substituents being propyl or hexyl.

- Applicants' Response

Applicants respectfully request that the Examiner hold this rejection in abeyance until patentable claims are to be issued in this application. Applicant if necessary will file an appropriate terminal disclaimer.

Provisional Rejections Over Claims 17-29 of Copending Application 11/113516

- Examiner's Position

The Examiner has provisionally rejected claims 1 and 14-21 on the grounds of non-statutory obvious-type double patenting as being unpatentable over claims 17 – 29 copending application 11/113516 (US 20050186382). The Examiner argues that although the conflicting claims are not identical, they are not patentably distinct because of the optical state change material recited in claim 26. The conflicting claim has not been patented.

- Applicants' Response

Applicants respectfully request that the Examiner hold this rejection in abeyance until patentable claims are to be issued in this application. Applicant if necessary will file an appropriate terminal disclaimer.

- Prior Art Made of Record but Not Relied Upon

- Examiner's Position

Examiner has made no new art of record.

- Applicants Response

No response is needed by Applicants.

CONCLUSION TO REMARKS

Applicants assert that this response is fully responsive to the Examiner's Office action dated March 20, 2008. Applicants respectfully seek early allowance of the pending claims.

Respectfully Submitted,



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VI. APPENDIX

- No Appendix is attached